

<b>WASTE STREAM</b>	<b>1A08</b>	<b>Decay Stored Waste</b>
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**SITE** Amersham  
**SITE OWNER** GE Healthcare Limited  
**WASTE CUSTODIAN** GE Healthcare Limited

**WASTE TYPE** ILW

Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2022.....	~2.0 m <sup>3</sup>
Total future arisings:		0 m <sup>3</sup>
Total waste volume:		2.0 m <sup>3</sup>
Comment on volumes:	Manufacturing now ceased at The Grove Centre no future waste predicted. Stock volume well understood, no future volume due to cessation of manufacturing.	
Uncertainty factors on volumes:	Stock (upper): x 1.5	Arisings (upper) x
	Stock (lower): x 0.5	Arisings (lower) x

**WASTE SOURCE** General laboratory process waste that was generated as a result of manufacturing radioactive pharmaceutical products.

**PHYSICAL CHARACTERISTICS**

General description: The waste generated is typically small laboratory items that are packed into 5 litre metal cans. The waste consists of solid wastes within steel cans as primary containment, all contained in sealed PVC bags. Solids include glassware, rubber gloves, paper tissue and small items of redundant laboratory equipment such as hotplates, retort stands, etc. Waste undergoes decay storage.

Physical components (%wt): Glass 40%, Cellulosics 20%, Plastics/Rubber 35%, Metal 5%,

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): ~0.5

Comment on density: -

**CHEMICAL COMPOSITION**

General description and components (%wt): Glass 40%, Cellulosics 20%, Plastics/Rubber 35%, Metal 5%.

Chemical state: Neutral  
 Chemical form of radionuclides: H-3: Organic

Metals and alloys (%wt): Approximately 50% of metal will be present as sheet with a thickness of about 1mm. All other metal will be bulk items typical size 100mm long.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	TR		
Other ferrous metals.....	~5.0	Mild steel cans	
Iron.....	0		
Aluminium.....	TR		
Beryllium.....	0		
Cobalt.....	0		
Copper.....	0		
Lead.....	0		
Magnox/Magnesium.....	0		
Nickel.....	0		

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Titanium.....	0		
Uranium.....	0		
Zinc.....	0		
Zircaloy/Zirconium.....	0		
Other metals.....	0	Not present	
Organics (%wt):	PVC and neoprene present.		
	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	~~20.0		
Paper, cotton.....	~~20.0		
Wood.....	TR		
Halogenated plastics .....	~~20.0	PVC sheeting / gaitors	
Total non-halogenated plastics.....	~~5.0	Polyethylene	
Condensation polymers.....	TR		
Others.....	~~5.0		
Organic ion exchange materials....	0		
Total rubber.....	~~10.0		
Halogenated rubber .....	~~10.0	Hypalon/neoprene gloves/gaitors	
Non-halogenated rubber.....	TR		
Hydrocarbons.....	0		
Oil or grease .....			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	TR		
Other materials (%wt):	Glass lab equipment.		
	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....	0		
Glass/Ceramics.....	~~40.0		
Graphite.....	0		
Desiccants/Catalysts.....	0		
Asbestos.....	0		
Non/low friable.....			
Moderately friable.....			
Highly friable.....			

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Free aqueous liquids.....	0
Free non-aqueous liquids.....	0
Powder/Ash.....	TR

Inorganic anions (%wt): Inorganic anions present only as surface contamination. No details available at present.

	(%wt)	Type(s) and comment
Fluoride.....	TR	
Chloride.....	TR	
Iodide.....	TR	
Cyanide.....	0	
Carbonate.....	TR	
Nitrate.....	TR	
Nitrite.....	0	
Phosphate.....	TR	
Sulphate.....	TR	
Sulphide.....	TR	

Materials of interest for waste acceptance criteria: The waste contains no hazardous materials.

	(%wt)	Type(s) and comment
Combustible metals.....	0	
Low flash point liquids.....	0	
Explosive materials.....	0	
Phosphorus.....	0	
Hydrides.....	0	
Biological etc. materials.....	0	
Biodegradable materials.....	20.0	
Putrescible wastes.....	0	
Non-putrescible wastes.....	~20.0	paper / cotton.
Corrosive materials.....	0	
Pyrophoric materials.....	0	
Generating toxic gases.....	0	
Reacting with water.....	0	
Higher activity particles.....	0	
Soluble solids as bulk chemical compounds.....	0	

Hazardous substances / non hazardous pollutants: Boron (non-Boral) estimated using standard figures of 10% of glass is borosilicate, and boron concentration in borosilicate glass is 8%

	(%wt)	Type(s) and comment
Acrylamide.....	0	
Benzene.....	0	
Chlorinated solvents.....	0	
Formaldehyde.....	0	
Organometallics.....	0	

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Phenol.....	0	
Styrene.....	0	
Tri-butyl phosphate.....	0	
Other organophosphates.....	0	
Vinyl chloride.....	~20.0	PVC
Arsenic.....	0	
Barium.....	0	
Boron.....	~-0.32	
Boron (in Boral).....		
Boron (non-Boral).....	~-0.32	Borosilicate glass
Cadmium.....	0	
Caesium.....	0	
Selenium.....	0	
Chromium.....	P	Trace
Molybdenum.....	P	Trace
Thallium.....	0	
Tin.....	0	
Vanadium.....	0	
Mercury compounds.....	0	
Others.....	0	
Electronic Electrical Equipment (EEE)		
EEE Type 1.....	0	
EEE Type 2.....	0	
EEE Type 3.....	0	
EEE Type 4.....	0	
EEE Type 5.....	0	

Complexing agents (%wt):      No

	(%wt)	Type(s) and comment
EDTA.....		
DPTA.....		
NTA.....		
Polycarboxylic acids.....		
Other organic complexants.....		
Total complexing agents.....	0	

Potential for the waste to contain discrete items:      Yes. Some lab equipment / hand tools might be present

**TREATMENT, PACKAGING AND DISPOSAL**

**Waste that is currently ILW:** This waste is decay stored until it meets the LLW limits (typically 5 years). Typically within a 5 year period.

**WASTE STREAM 1A08 Decay Stored Waste**

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recycling / reuse Other / various None		100.0

Comment on planned treatments:

Waste decay stored then enters a LLW/LALLW stream (1A01/1A02)

**Disposal Routes:**

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	90.0	~0.50
Expected to be consigned to a Landfill Facility		
Expected to be consigned to an On-Site Disposal Facility	10.0	~0.50
Expected to be consigned to an Incineration Facility		
Expected to be consigned to a Metal Treatment Facility		
Expected to be consigned as Out of Scope		
Expected to be recycled / reused		
Disposal route not known		

Classification codes for waste expected to be consigned to a landfill facility: 20 01 01; 20 01 02; 20 01 38; 20 01 39; 20 01 40

**Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):**

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be consigned to an On-Site Disposal Facility			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be consigned as Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

**Opportunities for alternative disposal routing:** -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

**Waste Packaging for Disposal:** (Not applicable to this waste stream)



**WASTE STREAM 1A08 Decay Stored Waste**

Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3					Gd 153				
Be 10					Ho 163				
C 14					Ho 166m				
Na 22	-5.15E-08	AA			Tm 170				
Al 26					Tm 171				
Cl 36					Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54	-5.36E-12	AA			Pb 205				
Fe 55					Pb 210				
Co 60	-5.96E-06	AA			Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210				
Zn 65	-8.54E-06	AA			Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90					Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94					Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106	-2.19E-10	AA			U 233				
Pd 107					U 234				
Ag 108m					U 235				
Ag 110m	-1.85E-14	AA			U 236				
Cd 109	-9.42E-10	AA			U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				
Sn 123					Pu 239				
Sn 126					Pu 240				
Sb 125					Pu 241				
Sb 126					Pu 242				
Te 125m					Am 241				
Te 127m					Am 242m				
I 129					Am 243				
Cs 134	-1.09E-07	AA			Cm 242				
Cs 135					Cm 243				
Cs 137					Cm 244				
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144					Cf 249				
Pm 145					Cf 250				
Pm 147					Cf 251				
Sm 147					Cf 252				
Sm 151					Other a				
Eu 152					Other b/g	-3.92E-05	AA		
Eu 154					<b>Total a</b>	<b>0</b>			<b>0</b>
Eu 155					<b>Total b/g</b>	<b>-5.39E-05</b>	<b>AA</b>		<b>0</b>

**Bands (Upper and Lower)**

- A a factor of 1.5
- B a factor of 3
- C a factor of 10
- D a factor of 100
- E a factor of 1000

Note: Bands quantify uncertainty in mean radioactivity.

**Code**

- 1 Measured activity
- 2 Derived activity (best estimate)
- 3 Derived activity (upper limit)
- 4 Not present
- 5 Present but not significant
- 6 Likely to be present but not assessed
- 7 Present in significant quantities but not determined
- 8 Not expected to be present in significant quantity